

I CLAIM:

1. A package identification and tracking system for use in analyzing consumer buying decisions comprising:
 - a plurality of products, each having a tag with a unique code;
 - 5 a tag reader having a tag detection range; and
 - change of state detection means for determining when each said product enters or leaves said tag detection range.
- 10 2. The package identification and tracking system of claim 1 comprising:
 - prediction means adapted for predicting a consumer purchase decision.
- 15 3. A package identification and tracking system according to claim 1 wherein:
 - 10 said tag reader comprises a geometric array of reading devices having individual tag detection ranges; and
 - each said product is associated with a particular one of said reading devices.
- 20 4. A package identification and tracking system according to claim 3 wherein:
 - 15 said tag readers and said products are associated with a product display; and
 - 20 said tag readers comprise interrogators for identifying the unique code and physical location of each said product with respect to said product display.
5. A package identification and tracking system according to claim 4 and further comprising:

data storage means for compiling an inventory database including at least identification of all articles in the product display and the location status of each of the articles, the database receiving, from said tag readers, the initial location information and the article identification information for each of the articles on display; and

5 a processor in communication with the data storage means for updating the location status of the articles on display.

6. The package identification and tracking system according to claim 5 wherein each said tag is an RFID tag.

10 7. The package identification and tracking system according to claim 2 wherein:
said tag reader comprises a geometric array of reading devices having individual tag detection ranges; and
each said product is associated with a particular one of said reading devices.

15 8. The package identification and tracking system according to claim 7 wherein:
said tag readers and said products are associated with a product display; and
said tag readers comprise interrogators for identifying the unique code and physical location of each said product with respect to said product display.

20 9. The package identification and tracking system according to claim 8 and further comprising:

data storage means for compiling an inventory database including at least identification of all articles in the product display and the location status of each of the articles, the database receiving, from said tag readers, the initial location information and the article identification information for each of the articles on display; and

5 a processor in communication with the data storage means for updating the location status of the articles on display.

10. The package identification and tracking system according to claim 9 wherein each said tag is an RFID tag.

10 11. A package identification and tracking system for a retail outlet having articles available for selection and removal by customers, each of said articles having a radio frequency tag attached, each tag comprising an antenna for indicating the presence and identification of the associated article upon receiving an interrogation signal and returning a response signal, and an integrated circuit coupled to said antenna for storing at least article identification information and for supplying said article identification information with the response signal upon interrogation of said tag by an interrogator, the information with the response signal upon interrogation of said tag by an interrogator, the system comprising:

15 a plurality of interrogator antennas arranged in a geometric array located in a product display area of the retail facility for interrogating each said article to determine at least its location and identity for each said article, the interrogator receiving a response signal containing the stored article identification information for each of the articles to be offered to customers, wherein the interrogator may substantially simultaneously receive

response signals from a plurality of tagged articles;
data storage means for compiling an inventory database including at least
identification of all articles in the product display and the location status of each of the
articles, the database receiving the initial location information and the article
identification information for each of the articles on display; and
5 a processor in communication with the data storage means for updating the
location status of the articles on display.

12. The system according to claim 11 wherein the tag is an RFID tag.

10 13. An inventory control system for use in conjunction with articles which are
displayed in a retail establishment in accordance with claim 11, each of said articles
having a radio frequency tag attached, each tag comprising an antenna for use in
detecting the location and identity of said article by receiving an interrogation signal and
returning a response signal and an integrated circuit coupled to said antenna for storing at
15 least article identification information and for supplying said article identification
information with the response signal upon interrogation of said tag by an interrogator, the
system comprising:
information with the response signal upon interrogation of said tag by an interrogator, the
system comprising:

20 data storage means for storing an inventory database comprising at least
identification of the articles on display in said retail establishment and the location status
of each such article;

an article checkout system located in an article checkout area of the retail
establishment, the checkout system comprising a first interrogator for interrogating an

article that a customer has selected to remove from the retail establishment, the first interrogator receiving a response signal containing the stored article identification information for the article to be removed; and

5 a processor in communication with the first interrogator and the database, the processor receiving article identification information for the article to be removed from the first interrogator, and updating the inventory database with the location status of the article to be removed.

14. An inventory control system according to claim 13 and further comprising:

10 an article return facility for receiving articles which were removed from the retail establishment, each returned article passing through a check-in zone as the article is returned;

15 a second interrogator in communication with the inventory database, the second interrogator monitoring the check-in zone for a response signal caused by the presence of a tag within the zone, and outputting an interrogator output signal when a tag is detected in the zone, each interrogator output signal including the identification information stored in the integrated circuit of an interrogated tag for the article being returned, wherein the inventory database receives the interrogator output signals and updates the status of the article being returned using the interrogator output signals.

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15. An inventory control system according to claim 14 and further comprising:

an exit interrogator for monitoring an exit from the retail establishment so as to interrogate each article passing through the exit and being removed from the retail

establishment, the exit interrogator receiving a response signal from the tag associated with each article, the response signal containing the stored article identification information for the article passing through the exit; and

an exit processor coupled to the exit interrogator, the exit processor receiving an output signal from the exit interrogator including the identification information of the response signal, wherein the exit processor compares the received identification information with the information stored in the database to determine whether the article is recorded therein as checked out, wherein the exit interrogator activates an alarm if the article passing through the exit is not recorded in the database as checked out.

10 16 An inventory control system for use in conjunction with retail articles which are maintained in a retail storage area in accordance with claim 11, each of the articles having a radio frequency tag attached, each tag including an antenna for use in detecting the presence of the article by receiving an interrogation signal and returning a response signal and an integrated circuit connected to the antenna for storing article identification information and for outputting the article identification information with the response signal upon interrogation of the tag, the system comprising:

15 at least one article return area for receiving articles which were removed from the storage area and which are to be returned to the storage area, the article return area including an interrogation zone and a collection zone for holding returned articles, the returned articles passing through the interrogation zone and into the collection zone as the articles are returned, wherein plural articles may be simultaneously placed in the collection zone;

an interrogator for monitoring the collection zone for disturbances in the form of a response signal caused by the presence of one or more tags within the collection zone, the interrogator sequentially interrogating each retail article in the collection zone, the interrogator outputting an interrogator output signal for each tag detected in the collection zone, each interrogator output signal including the identification information stored in the integrated circuit of an interrogated tag; said interrogator being coupled to a database for receiving the interrogator output signals, the database including inventory data for retail articles monitored by the system including checkout status data, the received interrogator output signals being used to update the checkout status data of each returned retail article.

10 17 The system according to claim 16 wherein the inventory data includes article removal date data.

18. The system according to claim 17 wherein each said tag is an RFID tag.

15 19. A product display and information system comprising:

a plurality of product container supports for storing a quantity of product containers for display to customers;

identifier means for providing a unique identifier for each said product container;

20 sensing means associated with each of said product container supports for sensing and identifying individual ones of said containers;

data processing means for tracking individual ones of said containers with respect to said supports so as to generate product container movement data;

a communications network for transmitting signals comprising said unique
identifiers and at least said movement data; and
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a data processor coupled to said communications network for recovering said
transmitted signals to determine one or more parameters selected from a group
comprising inventory, sales, unauthorized removal, replacement, customer product
selection activity and time of occurrence of any of the foregoing.

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20. A product display and information system according to claim 19 wherein:
said sensing means further comprises antennae each associated with a respective
group of said product containers.

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21. A product display and information system according to claim 20 wherein:
said product container supports comprise product shelves, each of said shelves
supports a plurality of product containers and each of said antennae is associated with one
of said shelves and with a plurality of said product containers.

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22. A product display and information system according to claim 21 wherein:
each of said antennae is associated with a group of said containers arranged in a
geometric pattern on a respective one of said shelves in close proximity to one of said
antennae.

23. A product display and information system according to claim 20 wherein:

5 said data processing means comprises a memory for storing each said unique identifier for each product container and a corresponding location for each said product container; and

5 said sensing means detects any absence of a previously identified product container.

24. A product display and information system according to claim 19 wherein:

10 said identifier means comprises an electronic radio frequency identification device.

25. A product display and information system according to claim 22 wherein:

15 said identifier means comprises an electronic radio frequency identification device.